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EXAMINER	
THANGAVELU, KANDASAMY	
ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/897,556	OSBORN ET AL.
	Examiner	Art Unit
	Kandasamy Thangavelu	2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-10,12-28,31-34,36-46,48-53 and 55-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7-10,12-28,31-34,36-46,48-53 and 55-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on *03 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3 July 2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. This communication is in response to the Applicants' Response mailed on July 27, 2005. Claims 1-4, 7-10, 12-16, 19, 25, 31, 36, 38, 39, 43, 45, 50, 55 and 56 were amended. Claims 5-6, 11, 29-30, 35, 47 and 54 were canceled. Claims 1-4, 7-10, 12-28, 31-34, 36-46, 48-53 and 55-57 of the application are pending. This office action is made non-final.

Claim Objections

2. The following is a quotation of 37 C.F.R § 1.75 (d)(1):

> The claim or claims must conform to the invention as set forth in the remainder of the specification and terms and phrases in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

3. Claims 7-10 and 31-34 are objected to under 37 CFR 1.75 as being a substantial duplicate of claims 1-4 and 25-28 respectively. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 38 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5.1 Claim 38 recites, "The method according to claim 36, wherein the simulating predicts life cycle events and costs associated with each event". There is insufficient antecedent basis for "the simulating" in this limitation, since claim 36 and its base claim 35 do not refer to simulating.

6. Claims 36-38 rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are:

Claim 36 states, "A method for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, comprising:

storing a plurality of service data for the system;

preprocessing the plurality of service data in accordance with a user specified reliability analysis selection; and

providing an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data".

However, it is not possible to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components, by storing the data, preprocessing the data and providing an interactive graphics tool alone. The method should include the steps of :

organizing the system and the plurality of subsystems and components into a hierarchical representation;

providing a plurality of options for analyzing the hierarchical representation; and

performing a reliability analysis at any level of the hierarchical representation.

Claims rejected but not specifically addressed are rejected based on their dependency on rejected claims.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7.1 Independent claim 50 recites a computer-readable medium storing computer instructions

for instructing a computer system to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing. The limitations recited in claim contain various steps, which are not statutory subject matter. To be statutory, the claim should specify the computer-readable medium storing computer instructions **which when executed in a computer performs a process** comprising the steps included in the limitations.

The limitations recited in dependent claims 51-54 contain a computer-readable medium which is not statutory subject matter.

7.2 Independent claim 55 recites a computer-readable medium storing computer instructions for instructing a computer system to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing. The limitations recited in claim contain various steps, which are not statutory subject matter. To be statutory, the claim should specify the computer-readable medium storing computer instructions **which when executed in a computer performs a process** comprising the steps included in the limitations.

7.3 Independent claim 56 recites a computer-readable medium storing computer instructions for instructing a computer system to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing. The limitations recited in claim contain various steps, which are not statutory subject matter. To be statutory, the claim should specify the computer-readable

medium storing computer instructions **which when executed in a computer performs a process** comprising the steps included in the limitations.

The limitations recited in dependent claim 57 contain a computer-readable medium which is not statutory subject matter.

Claims rejected but not specifically addressed are rejected based on their dependency on rejected claims.

8.1 Claims 50-54 would be statutory if claim 50 is rewritten as:

A computer-readable medium storing computer instructions **which when executed on a computer perform a process** for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing for:

8.2 Claim 55 would be statutory if it is rewritten as:

A computer-readable medium storing computer instructions **which when executed on a computer perform a process** for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing for:

8.3 Claim 56-57 would be statutory if claim 56 is rewritten as:

A computer-readable medium storing computer instructions **which when executed on a computer perform a process** for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem, the computer instructions implementing computer processing for:

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

10. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1-3, 7-9, 12-14, 25-27, 31-33, 39-41, 50-52 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of

Weinstock et al. (U.S. Patent 6,223,143), and further in view of **Goyal et al.** (U.S. Patent 5,625,575).

11.1 **Willoughby et al.** teaches reliability of electrical distribution networks. Specifically, as per claim 1, **Willoughby et al.** teaches an interactive graphics-based system for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

a processor for executing instructions, a memory for storing instructions and data, a display device and an interactive graphics-based tool (Fig. 8); comprising:

an interactive selection component that provides a plurality of options for analyzing the hierarchical representation (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50); and

a reliability analysis component, responsive to the interactive selection component, that performs a reliability analysis (Abstract, L1-5 and L9-27; CL1, 43-50; CL1, L55-57; CL2, L33-35).

Willoughby et al. does not expressly teach a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22), because that provides a reliability and risk analysis system with an

easily understood and generated hierarchical decomposition of the systems (CL2, L66-67). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. The artisan would have been motivated because that would provide a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems.

Willoughby et al. does not expressly teach a reliability analysis component, responsive to the hierarchical representation component that performs a reliability analysis at any level of the hierarchical representation. **Weinstock et al.** teaches a reliability analysis component, responsive to the hierarchical representation component that performs a reliability analysis at any level of the hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a reliability analysis component, responsive to the hierarchical representation component that performs a reliability analysis at any level of the hierarchical representation. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

Willoughby et al. does not expressly teach a visualization component that provides a movie mode display of the reliability analysis. **Goyal et al.** teaches a visualization component that provides a movie mode display of the reliability analysis (CL1; L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45), because that allows presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Goyal et al.** that included a visualization component that provided a movie mode display of the reliability analysis. The artisan would have been motivated because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback.

11.2 As per claim 2, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 1. **Willoughby et al.** does not expressly teach that the hierarchical representation generated by the hierarchical representation component takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node. **Weinstock et al.** teaches that the hierarchical representation generated by the hierarchical representation component takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included the hierarchical representation generated by the hierarchical representation component taking the form of a tree structure wherein the system and plurality of subsystems and components were represented in the tree structure by a node. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

11.3 As per claim 3, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 2. **Willoughby et al.** teaches the plurality of options provided by the interactive selection component (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** does not

expressly teach that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. **Weinstock et al.** teaches that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes (Fig. 5C, Item 535 and 537; Fig. 6; Fig. 7; CL10, L45-62), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included the plurality of options provided by the interactive selection component comprising at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

11.4 As per Claims 7-9, these are rejected based on the same reasoning as Claims 1-3, supra. Claims 7-9 are system claims reciting the same limitations as Claims 1-3, as taught throughout by **Willoughby et al.**, **Weinstock et al.** and **Goyal et al.**

11.5 As per claim 12, **Willoughby et al.** teaches a graphics-based system for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components

within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

a processor for executing instructions, a memory for storing instructions and data, a display device and a graphics-based tool (Fig. 8).

Willoughby et al. does not expressly teach means for organizing the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches means for organizing the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22), because that provides a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems (CL2, L66-67). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included means for organizing the system and the plurality of subsystems and components into a hierarchical representation. The artisan would have been motivated because that would provide a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems.

Willoughby et al. does not expressly teach means for providing a plurality of options for analyzing the hierarchical representation. **Weinstock et al.** teaches means for providing a plurality of options for analyzing the hierarchical representation (Figs. 10, 12, 13, 14A, 16, 18 and 21), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences,

system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included means for providing a plurality of options for analyzing the hierarchical representation. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

Willoughby et al. does not expressly teach means, responsive to the organizing means and the providing means, for performing a reliability analysis at any level of the hierarchical representation. **Weinstock et al.** teaches means, responsive to the organizing means and the providing means, for performing a reliability analysis at any level of the hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included means, responsive to the organizing means and the providing means, for performing a reliability analysis at any level of the hierarchical representation. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

Willoughby et al. does not expressly teach means for generating a visualization of the reliability analysis in a movie mode display. **Goyal et al.** teaches means for generating a visualization of the reliability analysis in a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45), because that allows presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Goyal et al.** that included means for generating a visualization of the reliability analysis in a movie mode display. The artisan would have been motivated because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback.

11.6 As per claim 13, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 12. **Willoughby et al.** does not expressly teach that the hierarchical representation generated by the organizing means takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node. **Weinstock et al.** teaches that the hierarchical representation generated by the organizing means takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62). The motivation for combining **Willoughby et al.** and **Weinstock et al.** is presented in Paragraph 11. 2 above.

11.7 As per claim 14, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 13. **Willoughby et al.** teaches the plurality of options provided by the providing means (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** does not expressly teach that the plurality of options provided by the providing means comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. **Weinstock et al.** teaches that the plurality of options provided by the providing means comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes (Fig. 5C, Item 535 and 537; Fig. 6; Fig. 7; CL10, L45-62). The motivation for combining **Willoughby et al.** and **Weinstock et al.** is presented in Paragraph 11. 3 above.

11.8 As per Claims 25-27 and 31-33, these are rejected based on the same reasoning as Claims 1-3, and 7-9 <u>supra.</u> Claims 25-27 and 31-33 are computer-implemented method claims reciting

the same limitations as Claims 1-3 and 7-9, as taught throughout by **Willoughby et al.**, **Weinstock et al.** and **Goyal et al.**

11.9 As per claim 39, **Willoughby et al.** teaches a computer-implemented method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising computer-implemented steps for:

prompting the user to select from a plurality of analyzing options (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50);

in response to the user selection, performing a reliability analysis (Abstract, L1-5 and L9-27; CL1, 43-50; CL1, L55-57; CL2, L33-35).

Willoughby et al. does not expressly teach prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22), because that provides a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems (CL2, L66-67). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation. The artisan would

have been motivated because that would provide a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems.

Willoughby et al. does not expressly teach in response to the user selection, performing a reliability analysis at any level of the hierarchical representation. **Weinstock et al.** teaches in response to the user selection, performing a reliability analysis at any level of the hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included in response to the user selection, performing a reliability analysis at any level of the hierarchical representation. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

Willoughby et al. does not expressly teach providing a visualization of the reliability analysis in a movie mode display. **Goyal et al.** teaches providing a visualization of the reliability analysis in a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45), because that allows presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various

speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Goyal et al.** that included providing a visualization of the reliability analysis in a movie mode display. The artisan would have been motivated because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback.

11.10 As per claim 40, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the method of claim 39. **Willoughby et al.** does not expressly teach that the hierarchical representation takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node. **Weinstock et al.** teaches that the hierarchical representation takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62), because

that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included the hierarchical representation taking the form of a tree structure wherein the system and plurality of subsystems and components were represented in the tree structure by a node. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

11.11 As per claim 41, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the method of claim 40. **Willoughby et al.** teaches the plurality of options provided by the interactive selection component (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** does not expressly teach that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. **Weinstock et al.** teaches that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes (Fig. 5C, Item 535 and 537; Fig. 6; Fig. 7; CL10, L45-62), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It

would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included the plurality of options provided by the interactive selection component comprising at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

11.12 As per Claims 50-52 and 55 these are rejected based on the same reasoning as Claims 31-33 and 39, supra. Claims 50-52 and 55 are computer-readable medium claims reciting the same limitations as Claims 31-33 and 39, as taught throughout by **Willoughby et al., Weinstock et al.** and **Goyal et al.**

12. Claims 4, 10, 15, 19-22, 24, 28, 34, 42 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Weinstock et al.** (U.S. Patent 6,223,143) and **Goyal et al.** (U.S. Patent 5,625,575), and further in view of **Spira et al.** (U.S. Patent Application 2003/0172002).

12.1 As per claim 4, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 1. **Willoughby et al.** teaches that the reliability analysis component performs at least one of a reliability prediction (CL1, L45-47; Abstract, L1-5 and L18-20; CL1, L55-57; CL3, L33-35).

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a statistical analysis. **Weinstock et al.** teaches that the reliability analysis component performs at least one of a statistical analysis (CL2, L2-9), because that allows time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables (CL2, L3-4). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included the reliability analysis component performing at least one of a statistical analysis. The artisan would have been motivated because that would allow time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables.

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a life cycle cost analysis. **Spira et al.** teaches that the reliability analysis component performs at least one of a life cycle cost analysis (Page 2, Para 0031; Page 2, Para 0032), because that enhances the system owner's financial system results (profit) and lowers the cost over the life time of the system, through a proactive based maintenance approach (Page 2, Para 0031; Page 2, Para 0032). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Spira et al.** that included the reliability analysis component performing at least one of a life cycle cost analysis. The artisan would have been motivated because that would enhance the system owner's financial system results (profit) and lower the cost over the life time of the system, through a proactive based maintenance approach.

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a maintenance projection. **Spira et al.** teaches that the reliability analysis component performs at least one of a maintenance projection (Fig. 12, Items 504 and 506; Fig. 18; Page 1, Para 0001; Page 10, Para 0137), because that allows establishing a maintenance plan, a failure mode and effects analysis and reliability centered maintenance (Page 8, Para 0112). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Spira et al.** that included the reliability analysis component performing at least one of a maintenance projection. The artisan would have been motivated because that would allow establishing a maintenance plan, a failure mode and effects analysis and reliability centered maintenance.

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a inventory forecasting. **Spira et al.** teaches that the reliability analysis component performs at least one of a inventory forecasting (Fig. 17, Item 106; Page 10, Para 0134), because the inventory forecasting provides opportunities for inventory optimization and reduction (Page 10, Para 0134); and opportunities to reduce costs over life time of the system (Page 4, Para 0048). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Spira et al.** that included the reliability analysis component performing at least one of a inventory forecasting. The artisan would have been motivated because the inventory forecasting would provide opportunities for inventory optimization and reduction; and opportunities to reduce costs over life time of the system.

12.2 As per claim 10, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 7. **Willoughby et al.** teaches that the reliability analysis component performs at least one of a reliability prediction (CL1, L45-47; Abstract, L1-5 and L18-20; CL1, L55-57; CL3, L33-35).

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a statistical analysis. **Weinstock et al.** teaches that the reliability analysis component performs at least one of a statistical analysis (CL2, L2-9), because that allows time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables (CL2, L3-4). The motivation for combining **Willoughby et al.** and **Weinstock et al.** is presented in Paragraph 12.1 above.

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a life cycle cost analysis. **Spira et al.** teaches that the reliability analysis component performs at least one of a life cycle cost analysis (Page 2, Para 0031; Page 2, Para 0032), because that enhances the system owner's financial system results (profit) and lowers the cost over the life time of the system, through a proactive based maintenance approach (Page 2, Para 0031; Page 2, Para 0032). The motivation for combining **Willoughby et al.** and **Spira et al.** is presented in Paragraph 12.1 above.

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a maintenance projection. **Spira et al.** teaches that the reliability analysis component performs at least one of a maintenance projection (Fig. 12, Items 504 and 506; Fig. 18; Page 1, Para 0001; Page 10, Para 0137), because that allows establishing a maintenance plan, a failure mode and effects analysis and reliability centered maintenance (Page

8, Para 0112). The motivation for combining **Willoughby et al.** and **Spira et al.** is presented in Paragraph 12.1 above.

Willoughby et al. does not expressly teach that the reliability analysis component performs at least one of a inventory forecasting. **Spira et al.** teaches that the reliability analysis component performs at least one of a inventory forecasting (Fig. 17, Item 106; Page 10, Para 0134), because the inventory forecasting provides opportunities for inventory optimization and reduction (Page 10, Para 0134); and opportunities to reduce costs over life time of the system (Page 4, Para 0048). The motivation for combining **Willoughby et al.** and **Spira et al.** is presented in Paragraph 12.1 above.

12.3 As per claim 15, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 12. **Willoughby et al.** teaches that the reliability analysis means performs at least one of a reliability prediction (CL1, L45-47; Abstract, L1-5 and L18-20; CL1, L55-57; CL3, L33-35).

Willoughby et al. does not expressly teach that the reliability analysis means performs at least one of a statistical analysis. **Weinstock et al.** teaches that the reliability analysis means performs at least one of a statistical analysis (CL2, L2-9), because that allows time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables (CL2, L3-4). The motivation for combining **Willoughby et al.** and **Weinstock et al.** is presented in Paragraph 12.1 above.

Willoughby et al. does not expressly teach that the reliability analysis means performs at least one of a life cycle cost analysis. **Spira et al.** teaches that the reliability analysis means

performs at least one of a life cycle cost analysis (Page 2, Para 0031; Page 2, Para 0032), because that enhances the system owner's financial system results (profit) and lowers the cost over the life time of the system, through a proactive based maintenance approach (Page 2, Para 0031; Page 2, Para 0032). The motivation for combining **Willoughby et al.** and **Spira et al.** is presented in Paragraph 12.1 above.

Willoughby et al. does not expressly teach that the reliability analysis means performs at least one of a maintenance projection. **Spira et al.** teaches that the reliability analysis means performs at least one of a maintenance projection (Fig. 12, Items 504 and 506; Fig. 18; Page 1, Para 0001; Page 10, Para 0137), because that allows establishing a maintenance plan, a failure mode and effects analysis and reliability centered maintenance (Page 8, Para 0112). The motivation for combining **Willoughby et al.** and **Spira et al.** is presented in Paragraph 12.1 above.

Willoughby et al. does not expressly teach that the reliability analysis means performs at least one of a inventory forecasting. **Spira et al.** teaches that the reliability analysis means performs at least one of a inventory forecasting (Fig. 17, Item 106; Page 10, Para 0134), because the inventory forecasting provides opportunities for inventory optimization and reduction (Page 10, Para 0134); and opportunities to reduce costs over life time of the system (Page 4, Para 0048). The motivation for combining **Willoughby et al.** and **Spira et al.** is presented in Paragraph 12.1 above.

12.4 As per claim 19, **Willoughby et al.** teaches a system for performing analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

an interactive graphics-based tool for performing a reliability analysis on the system in accordance with the plurality of service data (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); the interactive graphics-based tool comprising:

an interactive selection component that provides a plurality of options for analyzing the hierarchical representation (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50); and

a first computing unit configured to serve the data repository and the interactive graphics-based tool (Fig. 8; Fig. 9, Item s 940 and 855).

Willoughby et al. does not expressly teach a data repository containing a plurality of service data for the system. **Spira et al.** teaches a data repository containing a plurality of service data for the system (Page 2, Para 0021), because the knowledge base forms a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events (Page 2, Para 0021). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Spira et al.** that included a data repository containing a plurality of service data for the system. The artisan would have been motivated because the knowledge base would form a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events.

Willoughby et al. does not expressly teach a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22), because that provides a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems (CL2, L66-67). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. The artisan would have been motivated because that would provide a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems.

Willoughby et al. does not expressly teach a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation. **Weinstock et al.** teaches a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation (CL2, L2-9), because that allows time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables (CL2, L3-4). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a

statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation. The artisan would have been motivated because that would allow time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables.

Willoughby et al. does not expressly teach a visualization component that provides a movie mode display of the statistical analysis. **Goyal et al.** teaches a visualization component that provides a movie mode display of the statistical analysis (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45), because that allows presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Goyal et al.** that included a visualization component that provided a movie mode display of the statistical analysis. The artisan would have been motivated because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in

slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback.

12.5 As per claim 20, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al.** does not expressly teach that the data repository stores historical failure data for the system. **Spira et al.** teaches that the data repository stores historical failure data for the system (Page 2, Para 0021), because the knowledge base forms a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events (Page 2, Para 0021). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Spira et al.** that included the data repository storing historical failure data for the system. The artisan would have been motivated because the knowledge base would form a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events.

12.6 As per claim 21, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al.** does not expressly teach a simulator that simulates the reliability of the plurality of service data in accordance with the statistical model. **Weinstock et al.** teaches a simulator that simulates the reliability of the plurality of service data in accordance with the statistical model (Fig. 5C; CL2, L2-9; Fig. 16; CL16, L44-59; CL18, L37-

59), because that allows various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios (CL17, L14-15 and L9-10). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a simulator that simulates the reliability of the plurality of service data in accordance with the statistical model. The artisan would have been motivated because that would allow various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios.

12.7 As per claim 22, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al.** teaches an expert system that assists the interactive graphics-based tool in performing the reliability analysis (Fig. 9, Item 850; CL2, L40-45; Cl14, L37-43; CL15, L14-22).

12.8 As per claim 24, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al.** does not expressly teach a second computing unit configured to interact with the data repository and the interactive graphics-based tool served from the first computing unit over a network. **Spira et al.** teaches a second computing unit configured to interact with the data repository and the interactive graphics-based tool served from the first computing unit over a network (Page 2, Para 0021; Page 3, Para 0037; Fig. 2; Page 3, Para 0038; Page 9, Para 0117), because that allows standard organization software like Computerized Maintenance Management System (CMMS) to be employed over the internet

(Page 3, Para 0038). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Spira et al.** that included a second computing unit configured to interact with the data repository and the interactive graphics-based tool served from the first computing unit over a network. The artisan would have been motivated because that would allow standard organization software like Computerized Maintenance Management System (CMMS) to be employed over the internet.

12.9 As per Claims 28, 34 and 42, these are rejected based on the same reasoning as Claims 4, 10 and 10, supra. Claims 28, 34 and 42 are method claims reciting the same limitations as Claims 4, 10 and 10, as taught throughout by **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.**

12.10 As per Claim 53 it is rejected based on the same reasoning as Claim 4, supra. Claim 53 is a computer-readable medium claim reciting the same limitations as Claims 4, as taught throughout by **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.**

13. Claims 16, 17, 23, 38, 44-49 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Spira et al.** (U.S. Patent Application 2003/0172002), **Wegerich et al.** (U.S. Patent Application 2002/0183971) and **Weinstock et al.** (U.S. Patent 6,223,143), and further in view of and **Goyal et al.** (U.S. Patent 5,625,575).

13.1 As per claim 16, **Willoughby et al.** teaches a system for performing analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

a processor for executing instructions, a memory for storing instructions and data, a display device (Fig. 8);

an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); the interactive graphics-based tool comprising:

an interactive selection component that provides a plurality of options for analyzing the hierarchical representation (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50).

Willoughby et al. does not expressly teach a data repository containing a plurality of service data for the system. **Spira et al.** teaches a data repository containing a plurality of service data for the system (Page 2, Para 0021), because the knowledge base forms a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events (Page 2, Para 0021). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Spira et al.** that included a data repository containing a plurality of service data for the system. The artisan would have been motivated because the knowledge base would form a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events.

Willoughby et al. teaches a user specified reliability analysis selection (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** does not expressly teach an interactive data preprocessor that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection. **Wegerich et al.** teaches an interactive data preprocessor that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection (Fig. 1, Item 110; Page 2, Para 0033; Page 3, Para 0034), because that allows using historical service data to learn normal states of operation and use the data for diagnostics (Page 3, Para 0037 and Page 6, Para 0062). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Wegerich et al.** that included an interactive data preprocessor that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection. The artisan would have been motivated because that would allow using historical service data to learn normal states of operation and use the data for diagnostics.

Willoughby et al. does not expressly teach a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22), because that provides a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems (CL2, L66-67). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a

hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. The artisan would have been motivated because that would provide a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems.

Willoughby et al. does not expressly teach a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation. **Weinstock et al.** teaches a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation (CL2, L2-9), because that allows time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables (CL2, L3-4). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation. The artisan would have been motivated because that would allow time based quantification of failure modes, such as uncertainty distribution and probability as a function of variables.

Willoughby et al. does not expressly teach a visualization component that provides a movie mode display of the statistical analysis. **Goyal et al.** teaches a visualization component that provides a movie mode display of the statistical analysis (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45), because that allows presenting the results of the analysis in the form of

an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Goyal et al.** that included a visualization component that provided a movie mode display of the statistical analysis. The artisan would have been motivated because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback.

13.2 As per claim 17, **Willoughby et al., Spira et al., Wegerich et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 16. **Willoughby et al.** teaches an expert system that assists the interactive graphics-based tool in performing the reliability analysis (Fig. 9, Item 850; CL2, L40-45; Cl14, L37-43; CL15, L14-22).

13.3 As per claim 23, **Willoughby et al., Weinstock et al., Spira et al.** and **Goyal et al.** teach the system of claim 19. **Willoughby et al.** does not expressly teach a data preprocessor that preprocesses the plurality of service data. **Wegerich et al.** teaches a data preprocessor that preprocesses the plurality of service data (Fig. 1, Item 110; Page 2, Para 0033; Page 3, Para 0034), because that allows using historical service data to learn normal states of operation and use the data for diagnostics (Page 3, Para 0037 and Page 6, Para 0062). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Wegerich et al.** that included a data preprocessor that preprocesses the plurality of service data. The artisan would have been motivated because that would allow using historical service data to learn normal states of operation and use the data for diagnostics.

13.4 As per claim 38, **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** teach the method of claim 36. **Willoughby et al.** does not expressly teach simulating the reliability of the plurality of service data in accordance with the statistical model. **Weinstock et al.** teaches simulating the reliability of the plurality of service data in accordance with the statistical model (Fig. 5C; CL2, L2-9; Fig. 16; CL16, L44-59; CL18, L37-59), because that allows various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios (CL17, L14-15 and L9-10). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included simulating the

reliability of the plurality of service data in accordance with the statistical model. The artisan would have been motivated because that would allow various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios.

Willoughby et al. does not expressly teach predicting life cycle events and costs associated with each event. **Spira et al.** teaches predicting life cycle events and costs associated with each event (Page 2, Para 0031; Page 2, Para 0032), because that enhances the system owner's financial system results (profit) and lowers the cost over the life time of the system, through a proactive based maintenance approach (Page 2, Para 0031; Page 2, Para 0032). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** and **Spira et al.** that included simulating predicting life cycle events and costs associated with each event. The artisan would have been motivated because that would enhance the system owner's financial system results (profit) and lower the cost over the life time of the system, through a proactive based maintenance approach.

13.5 As per claim 44, **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** teach the method of claim 43. **Willoughby et al.** does not expressly teach that the performing of the user specified reliability analysis comprises prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches that the performing of the user specified reliability analysis comprises prompting the user to organize the system and the plurality of subsystems and components into a hierarchical

representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22), because that provides a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems (CL2, L66-67). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included the performing of the user specified reliability analysis comprising prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation. The artisan would have been motivated because that would provide a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems.

13.6 As per claim 45, **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** and **Wegerich et al.** teach the method of claim 44. **Willoughby et al.** teaches that the performing of the user specified reliability analysis comprises prompting the user to select from a plurality of analyzing options (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50).

13.7 As per claim 46, **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** and **Wegerich et al.** teach the method of claim 45. **Willoughby et al.** does not expressly teach that the performing of the user specified reliability analysis comprises performing a reliability analysis at any level of the hierarchical representation in response to the user selection. **Weinstock et al.** teaches that the performing of the user specified reliability analysis comprises performing a reliability analysis at any level of the hierarchical representation in response to the

user selection. (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62), because that assesses reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included the performing of the user specified reliability analysis comprising performing a reliability analysis at any level of the hierarchical representation in response to the user selection.. The artisan would have been motivated because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times.

13.8 As per claim 48, **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** teach the method of claim 43. **Willoughby et al.** does not expressly teach performing a simulation of the reliability of the plurality of service data in accordance with the statistical model. **Weinstock et al.** teaches performing a simulation of the reliability of the plurality of service data in accordance with the statistical model (Fig. 5C; CL2, L2-9; Fig. 16; CL16, L44-59; CL18, L37-59), because that allows various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios (CL17, L14-15 and L9-10). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included a performing a simulation of the reliability of the plurality of service data in

accordance with the statistical model. The artisan would have been motivated because that would allow various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios.

13.9 As per claim 49, **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** and **Wegerich et al.** teach the method of claim 36. **Willoughby et al.** does not expressly teach simulating the reliability of the plurality of service data in accordance with the statistical model. **Weinstock et al.** teaches simulating the reliability of the plurality of service data in accordance with the statistical model (Fig. 5C; CL2, L2-9; Fig. 16; CL16, L44-59; CL18, L37-59), because that allows various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios (CL17, L14-15 and L9-10). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** that included simulating the reliability of the plurality of service data in accordance with the statistical model. The artisan would have been motivated because that would allow various probability distributions to be run at the selected hierarchical level and the risks ranked by the failure modes, subsystems and failure scenarios.

Willoughby et al. does not expressly teach predicting life cycle events and costs associated with each event. **Spira et al.** teaches predicting life cycle events and costs associated with each event (Page 2, Para 0031; Page 2, Para 0032), because that enhances the system owner's financial system results (profit) and lowers the cost over the life time of the system, through a proactive based maintenance approach (Page 2, Para 0031; Page 2, Para 0032). It

would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Weinstock et al.** and **Spira et al.** that included simulating predicting life cycle events and costs associated with each event. The artisan would have been motivated because that would enhance the system owner's financial system results (profit) and lower the cost over the life time of the system, through a proactive based maintenance approach.

13.10 As per Claim 57, it is rejected based on the same reasoning as Claim 48, supra. Claim 57 is a computer-readable medium claim reciting the same limitations as Claims 48, as taught throughout by **Willoughby et al., Weinstock et al., Spira et al., Goyal et al.** and **Wegerich et al.**

14. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Weinstock et al.** (U.S. Patent 6,223,143), and further in view of **Spira et al.** (U.S. Patent Application 2003/0172002), **Wegerich et al.** (U.S. Patent Application 2002/0183971), **Goyal et al.** (U.S. Patent 5,625,575), **Gross et al.** (U.S. Patent 5,774,379) and **Cook** (U.S. Patent 6,546,378).

14.1 As per claim 18, **Willoughby et al., Weinstock et al., Spira et al., Goyal et al.** and **Wegerich et al.** teach the system of claim 16. **Willoughby et al.** does not expressly teach that the data preprocessor performs at least one of determining censoring times, filtering data and segmenting data. **Gross et al.** that the data preprocessor performs at least one of determining

censoring times and filtering data (CL10, L46-51), because that that allows sensing slow degradation that occurs over a long period in the presence of noisy background (C103, L56-65). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Gross et al.** that included the data preprocessor performing at least one of determining censoring times and filtering data. The artisan would have been motivated because that would allow sensing slow degradation that occurred over a long period in the presence of noisy background.

Willoughby et al. does not expressly teach that the data preprocessor performs at least one of determining censoring times and segmenting data. **Cook** teaches that the data preprocessor performs at least one of determining censoring times and segmenting data (CL7, L10-13), because predictions can be made from interpretation of data segments (CL9, L63-65); and data segments can be used with classification modules to generate classifications (CL7, L10-13). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Cook** that included the data preprocessor performing at least one of determining censoring times and segmenting data. The artisan would have been motivated because predictions could be made from interpretation of data segments; and data segments could be used with classification modules to generate classifications.

15. Claims 36, 43 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Weinstock et al.** (U.S. Patent 6,223,143),

and further in view of **Wegerich et al.** (U.S. Patent Application 2002/0183971) and **Goyal et al.** (U.S. Patent 5,625,575).

15.1 As per claim 36, **Willoughby et al.** teaches method for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

providing an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data (Abstract, L1-5 and L9-27; Fig. 12E; CL1, L40-50; CL1, L55-57; CL2, L33-35).

Willoughby et al. does not expressly teach storing a plurality of service data for the system. **Spira et al.** teaches storing a plurality of service data for the system (Page 2, Para 0021), because the knowledge base forms a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events (Page 2, Para 0021). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Spira et al.** that included storing a plurality of service data for the system. The artisan would have been motivated because the knowledge base would form a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events.

Willoughby et al. does not expressly teach preprocessing the plurality of service data in accordance with a user specified reliability analysis selection. **Wegerich et al.** teaches preprocessing the plurality of service data in accordance with a user specified reliability analysis selection (Fig. 1, Item 110; Page 2, Para 0033 ; Page 3, Para 0034), because that allows using historical service data to learn normal states of operation and use the data for diagnostics (Page 3, Para 0037 and Page 6, Para 0062). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Wegerich et al.** that included preprocessing the plurality of service data in accordance with a user specified reliability analysis selection. The artisan would have been motivated because that would allow using historical service data to learn normal states of operation and use the data for diagnostics.

Willoughby et al. does not expressly teach providing a visualization of the reliability analysis as a movie mode display. **Goyal et al.** teaches providing a visualization of the reliability analysis as a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45), because that allows presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to

modify the method of **Willoughby et al.** with the method of **Goyal et al.** that included providing a visualization of the reliability analysis as a movie mode display. The artisan would have been motivated because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback.

15.2 As per claim 43, **Willoughby et al.** teaches a method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

prompting the user to specify a reliability analysis selection (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50);

performing the user specified reliability analysis (Abstract, L1-5 and L9-27; CL1, 43-50; CL1, L55-57; CL2, L33-35).

Willoughby et al. does not expressly teach storing a plurality of service data for the system. **Spira et al.** teaches storing a plurality of service data for the system (Page 2, Para 0021), because the knowledge base forms a system maintenance repository of historical data that

could be used for prediction of system events, system and component failure modes and events (Page 2, Para 0021). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Spira et al.** that included storing a plurality of service data for the system. The artisan would have been motivated because the knowledge base would form a system maintenance repository of historical data that could be used for prediction of system events, system and component failure modes and events.

Willoughby et al. teaches a user specified reliability analysis selection (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** does not expressly teach preprocessing the plurality of service data in accordance with the user specified reliability analysis selection. **Wegerich et al.** teaches preprocessing the plurality of service data in accordance with the user specified reliability analysis selection (Fig. 1, Item 110; Page 2, Para 0033 ; Page 3, Para 0034), because that allows using historical service data to learn normal states of operation and use the data for diagnostics (Page 3, Para 0037 and Page 6, Para 0062). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Wegerich et al.** that included preprocessing the plurality of service data in accordance with the user specified reliability analysis selection. The artisan would have been motivated because that would allow using historical service data to learn normal states of operation and use the data for diagnostics.

Willoughby et al. does not expressly teach providing a visualization of the reliability analysis as a movie mode display. **Goyal et al.** teaches providing a visualization of the reliability analysis as a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31,

L40-45), because that allows presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Goyal et al.** that included providing a visualization of the reliability analysis as a movie mode display. The artisan would have been motivated because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback.

15.3 As per Claim 56, it is rejected based on the same reasoning as Claim 43, supra. Claim 56 is a computer-readable medium claim reciting the same limitations as Claims 43, as taught throughout by **Willoughby et al., Wegerich et al., Spira et al.** and **Goyal et al.**

16. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Spira et al.** (U.S. Patent Application 2003/0172002), and further in view of **Wegerich et al.** (U.S. Patent Application 2002/0183971), **Goyal et al.** (U.S. Patent 5,625,575), **Gross et al.** (U.S. Patent 5,774,379) and **Cook** (U.S. Patent 6,546,378).

16.1 As per claim 37, **Willoughby et al., Spira et al. Wegerich et al.** and **Goyal et al.** teach the method of claim 36. **Willoughby et al.** does not expressly teach that the preprocessing comprises performing at least one of determining censoring times, filtering data and segmenting data. **Gross et al.** that the preprocessing comprises performing at least one of determining censoring times and filtering data (CL10, L46-51), because that that allows sensing slow degradation that occurs over a long period in the presence of noisy background (C103, L56-65). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Willoughby et al.** with the method of **Gross et al.** that included the preprocessing comprising performing at least one of determining censoring times and filtering data. The artisan would have been motivated because that would allow sensing slow degradation that occurred over a long period in the presence of noisy background.

Willoughby et al. does not expressly teach that the preprocessing comprises performing at least one of determining censoring times and segmenting data. **Cook** teaches that the preprocessing comprises performing at least one of determining censoring times and segmenting data (CL7, L10-13), because predictions can be made from interpretation of data segments (CL9, L63-65); and data segments can be used with classification modules to generate classifications (CL7, L10-13). It would have been obvious to one of ordinary skill in the art at the time of

Applicants' invention to modify the method of **Willoughby et al.** with the method of **Cook** that included the preprocessing comprising performing at least one of determining censoring times and segmenting data. The artisan would have been motivated because predictions could be made from interpretation of data segments; and data segments could be used with classification modules to generate classifications.

Response to Arguments

17. As per the applicants' argument that "none of the cited art discloses or suggests the provision of movie mode display for reliability and statistical analysis", the Examiner has found new reference **Goyal et al.** which teaches this feature.

Goyal et al. teaches a visualization component that provides a movie mode display of the reliability analysis (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45), because that allows presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation can be recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45).

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard, can be reached on 571-272-3749. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K. Thangavelu
Art Unit 2123
September 17, 2005